

AbstractID: 2479 Title: An investigation of the accuracy of film dosimetry using EDR2 film for the point dose determination for IMRT-QA

**Purpose:** To investigate the accuracy of film dosimetry using EDR2 film for point dose determination for IMRT-QA.

**Method and Materials:** This work compared point doses measured by EDR2 film with those by chamber for 135 IMRT cases. The dose to the measurement point was about 200 cGy.

EDR2 films were read and analyzed using a Vadar Scanner and the RIT Film Dosimetry System. In order to reduce the uncertainty of film dosimetry, the following measures were taken: (1) the H&D curve was obtained by placing the calibration films at 4 cm in solid water, and at the same depth of solid water EDR2 films were irradiated with planned IMRT fields for QA purpose; (2) each photon beam energy has its own H&D curve; (3) the length of time between film exposure and processing was always kept within 10 minutes since processing time delay affects the dose response of the film; and (4) the measurement point was chosen to be at low dose gradient region.

For chamber dosimetry, a 0.3cc PTW ion chamber (type 31003) was used in solid water.

**Results:** Comparisons of point doses measured by chamber and those by film show that, for 135 IMRT-QA measurements, 51% of point dose values from EDR2 films match corresponding dose values from chamber to within  $\pm 3\%$ , 72% of dose values to within  $\pm 5\%$ . However, for 28% of measurements, the deviation between dose values from EDR2 film and those from chamber is larger than  $\pm 5\%$ , the maximum deviation being 9.3%.

**Conclusion:** If the dose value determined by chamber can be considered as the “true value”, then we believe that the accuracy of EDR2 film still needs to be improved for point dose determination although the film is good for verification of relative dose distribution in our experience.